

BLM Research and Development

2005 RESEARCH AND DEVELOPMENT ACTIVITIES (\$000)

Conduct of R&D by Activity	2004		2005		2006	
	B.A.	Outlay	B.A.	Outlay	B.A.	Outlay
Basic Research	0	0	0	0	0	0
Applied Research	14,056	14,056	16,524	16,524	12,021	12,021
Development	2,585	2,585	1,323	1,323	1,014	1,014
R&D Facilities						
Conduct of R&D performed by Colleges and Universities*	4,819	4,819	3,895	3,895	2,971	2,971
Indirect Costs Related to R&D Performed by Colleges and Universities*	1,100	1,100	900	900	700	700
Merit Reviewed Scientific Research*	0	0	0	0	0	0
Total	16,641	16,641	17,867	17,867	13,035	13,035

*Numbers inclusive in Applied Research and Development totals listed above.

Estimated distribution (by percentage) of funding by R&D performers: In-house Activity (BLM, Federal and State agency partners) - 70%, private industry - 0%, colleges-university - 25%, other non-profit - 5%

PROGRAM OVERVIEW

The ultimate objective of the BLM Research and Development program is to make better use of new data, information, and knowledge to improve the management of the Nation's lands and resources. The BLM's Research and Development program supports improvements in organizational effectiveness, furthers the long-term goal of working with partners to identify scientific information needs, and then communicates these needs to research agencies, universities, and other non-governmental organizations.

The BLM has developed a formal Science Strategy that includes a process for identifying high-priority science needs and then meeting these needs either internally or in collaboration with science partners such as the U.S. Geological Survey (USGS), other agency science providers, and universities. The strategy also includes the identification and cataloging of scientific opportunities on the public lands, such as those found within Research Natural Areas, National Conservation Areas, and National Monuments. The BLM is currently preparing management

plans for several NCAs and National Monuments, which will include the identification of science opportunities and research needs.

The USGS serves as the primary research-science Bureau for the Department, addressing the scientific questions and research needs of the land-management bureaus. The BLM relies on the science capabilities within the USGS as its largest single source of scientific research support, although the BLM works with other Federal agencies, State agencies, and other organizations to meet its overall science needs. The USGS Geologic, Water Resources, and Geography Disciplines, support the BLM's mineral assessment, mining-related hydrologic studies, and abandoned mine land efforts. The USGS Biological Resources Discipline addresses the majority of the BLM's science needs relating to managing biological resources.

The BLM is a founding partner in the network of Cooperative Ecosystem Studies Units (CESU) that has been established at several of the Nation's leading universities by a number of Federal agencies. The BLM is increasingly making use of these CESU partnerships to meet its science needs and involve U.S. universities and colleges to a greater extent in providing sound science for managing the public lands and resources.

In 2006, the BLM will be beginning new investigations, including

- A study on the pre- and post-grazing effect on the unique amphibian populations inhabiting a series of earthen tanks within the Vekol Valley of the Sonoran Desert National Monument in Arizona.
- Initiating new study treatments to develop and test new options for young stand management to meet Northwest Forest Plan objectives in western Oregon.

The BLM will also pursue its ongoing projects, including continuing:

- Laying the foundation for future management actions for protection. Projects will include establishing baselines for resources in BLM's National Monuments and NCAs, understanding and evaluating the effects of energy development in the Rocky Mountain and Alaskan regions, improving management of western forests, controlling exotic species and weeds, and restoring of shrub-steppe and arid desert habitats.
- Continuing a multi-agency partnership studying the dynamics of Alaska's Bering Glacier, focusing on the evolution of the glacier's terminal regions and the effects on the surrounding ecosystem, describing and understanding the areas flora and fauna, evaluating potential flood hazards associated with ice dammed lakes, and understanding the glacier's response to ongoing climate change.
- Studying endangered species in the San Joaquin Valley in California. Due to variation in the annual precipitation and resulting vegetation, complications resulting from an extensive wildfire in the study area, and the need to collect data through a cycle of "wet" and "dry" years, the cooperating agencies plan to continue data collection in the San Joaquin Valley through the next several years.
- Determining how alternative management decisions affect biological diversity and recreation opportunities in chaparral and woodland ecosystems in California.
- Investigating the development of land use strategies to reduce fuel loading and promote the regeneration of knobcone pine on BLM lands in California.

- Conducting research and monitoring the effects of prescribed fire in the California sequoia forests for the purpose of using prescribed fire most effectively as a means to maintain giant sequoia grove health while reducing fuel hazards.
- Analyzing Mancos shale landscapes in the Gunnison Gorge Conservation Area for salt and sediment contributions in relation to plant populations, soil chemistry and erosion properties to better understand how salinity and selenium affect surface and ground water.
- Developing a Geographical Information System (GIS) risk assessment for wildland fire and hazardous fuel treatments to improve protection of cultural resource sites.
- Studying the effects of fragmented habitats and energy development on sage grouse ecology and behavior in the Great Basin and adjacent areas
- Examining how native mammalian grazers and top avian and mammalian predators directly and indirectly influence plant community dynamics and food web structures in the grasslands of the Intermountain West in Montana.
- Identifying and developing methodologies for native-origin seed collection, propagation, production and storage in the native plant materials development program in Utah and Nevada. Seeds from native vegetation are important for use in rehabilitating habitats damaged or destroyed by fire and invasive species.
- Planning similar efforts for elsewhere in the West, where projects are planned, in coordination with the U.S.D.A. National Resource Conservation Service and private seed growers, to furnish native seed, especially seed from native shrubs, forbs and some grasses, for restoration and reclamation efforts. Attention will continue to be focused on the Great Basin, where invasive species and wildfire have severely disrupted native ecosystems and where additional research is urgently needed to provide information useful in restoring damaged habitats. The Great Basin CESU is expected to help the BLM meet many of its science needs in this area.
- Expanding the Native Plant Materials Development Project, a program of seed collections, genetic and seed germination research directed at developing seed bank and plant cultivars for restoring native plant populations and degraded ecosystems in several western states. This project is a combined effort of the BLM with nonprofit organizations, universities and State, Federal and local government agencies to address the continued habitat deterioration and restore biodiversity in western ecosystems.
- Initiating new efforts with the USGS to study invasive plants such as tamarisk and leafy spurge, focusing on: prevention, early detection and rapid response; control and management; restoration; research; education and public awareness; and leadership and international cooperation.
- Studying the effectiveness of new state-of-the-art wildlife structures, including highway underpasses, deer fencing, and earthen escape ramps, for the passage of wildlife under an interstate highway in Utah.
- Understanding and promoting forest diversity and protecting riparian and aquatic resources through the Cooperative Forest Ecosystem Research project in the Pacific Northwest. Most of the research related to the Northwest Forest Plan is long-term in scope and is expected to continue for several years.

In addition to these projects, new research, studies and assessments will be initiated, and past research, studies and assessments will be continued to provide information related to development of energy and mineral resources and how best to protect valuable hydrological resources, as well as aquatic, riparian, and terrestrial habitats, in areas of energy and mineral

development. Wyoming, Colorado, Alaska, Utah and New Mexico are likely to be areas of focus for many of these efforts.

The Research and Development program supports the Department's Strategic Plan through the use of partnerships, a "supporting pillar" of the Plan, and science, the foundation for the plan. Many of the results of the program will fall within the mission goals of the Strategic Plan: Resource Protection, Resource Use, Recreation, and Serving Communities.

2004 PROGRAM PERFORMANCE ACCOMPLISHMENTS

Although the BLM's need for more data and information continues to increase, substantial progress was made in obtaining data and information in 2004 by the BLM, USGS, and other science partners. Highlights include:

- Continuing development of GIS techniques and databases for monitoring and understanding changing resource conditions and management situations on BLM-administered lands;
- Collaboration of BLM, USGS and Bureau of Reclamation scientists and land managers to understand the complex systems responsible for harmful concentrations of selenium, salt and sediment in portions of the upper Colorado River basin by developing the "Big File Cabinet" (BFC) concept to penetrate the science – land management interface. The BFC is a dynamic data management and analysis concept that will allow interactive use of multiple data layers to answer scientific and management questions.
- Cooperation of BLM with the USGS to develop of a new generation of Digital Ortho-photo Quarter Quads and high resolution digital elevation models for the National Petroleum Reserve, Alaska to facilitate exploration and extraction of new mineral and oil resources, to benefit Alaska's economy and to enhance living conditions of all Alaskans.
- Continuing assessments of energy and mineral resources, and research into techniques to minimize negative effects on other natural resources during exploration and development;
- Continuing development of new techniques and plant cultivars for restoring habitat damaged by exotic invading weeds and wildfire;
- Continuing efforts to collect new data and information on the resources of the BLM's NCAs and National Monuments to facilitate better management and provide information needed for development of land use plans. Efforts focused on plant and animals inventories, human use and recreation, paleontology and cultural resources;
- Continuing progress in the development of a cost-effective, reversible wild horse contraception vaccine, and continuation of efforts to understand the change in herd dynamics with vaccine use;
- Continuing progress in studies on sage grouse and restoration of sage grouse habitat in shrub-steppe ecosystems to gain a better understanding of sage grouse biology and ways to restore populations of this species and its habitats in this degraded, fragmented ecological system;
- Developing, in cooperation with USGS and others, SAGEMAP, a web-based information portal for issues in sagebrush ecosystems in western North America.
- Continuing ecological studies directed at better implementation of forest ecosystem based management in the Oregon Coast Range and the forested areas covered by the Northwest Forest Plan;

- Continuing to work with the USGS Recoverability and Vulnerability of Desert Ecosystems Project to provide land managers with the scientific understanding needed to conserve and restore threatened desert landscapes. Full recovery of the most sensitive species in the Mojave has been estimated to possibly take as long as two thousand years, so it is critical that the BLM conserve and protect existing fragile resources. In 2004 over 1,200 field plots to map and classify vegetation types in the eastern California Mojave were completed.
- Continuing progress in work-related to the Northwest Forest Plan research and monitoring effort, as well as continuing development of the Cooperative Forest Ecosystem Research Program and the development of a Coastal Landscape Analysis and Modeling System to research issues relevant to implementing forest ecosystem based management, specifically in the Oregon Coastal Range;
- Assessing land use and water-quality issues from naturally-occurring toxicants, such as selenium, and assessments of mercury contamination and mercury impacts in aquatic systems and biota, especially on the western slopes of Sierra Nevada. In 2004, BLM, in cooperation with the U.S. Forest Service, used USGS evaluations of mercury in stream biota, water and sediment to prioritize rivers and sites to facilitate remediation of contamination.
- Completing a study of a late Cretaceous dinosaur fossil bed in northern Alaska, using a revolutionary tunneling technique to excavate this site situated in permafrost terrain.

2005 PROGRAM PERFORMANCE ESTIMATES

In 2005, the BLM will begin new and continue past research and development efforts towards:

- Continuing studies with the USGS to understand the potential long-term responses in the hydrologic and ecologic systems overlying potential mining areas to provide information to assist the BLM in its management decisions related to resource mining permits;
- Initiating studies on salt loading into the Colorado River, a major concern since water is a primary source of irrigation and drinking water for the lower basin states;
- Investigating the effectiveness of selected plants in removing toxic metals from mine wastes as part of the Kerber Creek abandoned mine land restoration project in Colorado;
- Continuing projects under a Department of Energy sponsored program to study environmental concerns potentially limiting exploration and development of energy resources in the West;
- Continuing studies with the USGS to monitor and evaluate landslide hazards at sites in California, Colorado and Washington;
- Continuing studies in the Cooperative Forest Ecosystem Research Program in Oregon, emphasizing influences of landscape pattern and management on composition of terrestrial and aquatic species, riparian linkages and analysis of riparian management and conservation strategies and post-fire rehabilitation and ecology;
- Continuing to progress on studies on the juniper invasion of shrub-steppe ecosystems in the northern Great Basin and Pacific Northwest, including inventory and evaluation of past management treatment efforts for both pinyon and juniper;

- Concluding a four-year study in Utah of symbiotic relationships between soil mycorrhizae and vegetative communities, and the importance of this relationship to the success of ecosystem restoration and rehabilitation efforts;
- Continuing studies with the USGS on native grasslands and managed rangelands to quantify ecosystem condition, determine rare plant patterns, appraise species richness, and identify areas of native plant diversity. Studies will continue on understanding decreased nutritional content of plants, reduced diversity and productivity of native species, decreased water availability, diminished soil microbial populations, and accelerated rates of soil-surface erosion in desert and arid ecosystems;
- Continuing, as an ongoing integrative program, mapping infestations and accurately monitoring the spread of invasive species on western rangelands and their effects on ecosystems and native species, as well as improving methods for predicting areas most vulnerable to invasions, and assessing the effects of management practices and natural disturbances on invasions;
- Continuing studies at the Grand Staircase-Escalante National Monument, focusing on developing sustainable grazing and livestock management techniques compatible with the area's arid environment; characterization of the area's hydrology, monitoring changes in terrestrial and aquatic insects and invertebrates related to the cessation of grazing in the Escalante River corridor and studying the distribution and ecology of Escalante River fishes;
- Continuing research efforts on wild horses, working to refine multiple-year contraceptive vaccines, focusing on population modeling and fertility control on herd dynamics;
- After completing the initial studies on the effects of human-caused disturbance on marbled murrelets in California's Headwaters Forest in FY-2004, and synthesis of results in 2005, studies in 2006 will be directed at offshore population and distribution in the southern part of the murrelet's range, which includes the Headwaters area.
- Continuing studies of the effects of livestock grazing on a community of species at risk of extinction in the San Joaquin Valley;
- Continuing studies with the U.S. Forest Service on the ecology of sequoia groves and gathering data for use in developing strategies to apply prescribed fire as a means to maintain giant sequoia grove health while reducing fuel hazards;
- Continuing research on fire ecology, focusing on understanding the effects of wildland fire on wildlife habitat and ecosystem structure, function, sustainability, and restoration; emphasis is on the role of fire in the restoration of rangelands and the effectiveness of fire/vegetation treatments in the control of invasive plants; and,
- Continuing studies with the U.S. Army Cold Regions Research and Engineering Laboratory to monitor and study the long-term effects of wildfire on tundra soils and vegetation.

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